WHAT IS CLAIMED IS:

1. A device for detecting strain levels imposed on a circuit board, comprising:

an apparatus mounted on the circuit board;

an amplifier for detecting a change in the impedance of the apparatus and generating an output signal representing the change in the impedance of the apparatus; and

a signal conditioner for receiving the output signal and transmitting the output signal to a receiving device for real-time diagnostics.

2. The device as defined in claim 1, wherein the apparatus is a non-linear metallic trace.

3. The device as defined in claim 1, wherein the apparatus is a trace that is embedded into the circuit board.

4. The device as defined in claim 1, further comprising a bridge network coupled to the apparatus and the amplifier.

5. The device as defined in claim 1, wherein the apparatus is integrated with the circuit board.

6. The device as defined in claim 1, wherein the apparatus is a trace that is integrated with the circuit board.

7. The device as defined in claim 1, wherein the signal conditioner includes a plurality of capacitors and a plurality of resistors configured to set the gain of the amplifier.

8. The device as defined in claim 1, wherein the apparatus is a strain gage integrated with the circuit board.

9. The device as defined in claim 1, wherein the apparatus is a semiconductor chip capable of sensing strains imposed on the circuit board.

10. A system for monitoring the strain levels at particular locations on a circuit board located on a vehicle, comprising:

a strain indicator embedded into a layer of the circuit board;

an operational amplifier, mounted on the circuit board, for detecting a change in the resistance of the strain indicator and generating an output signal representing the change in the resistance of the strain indicator; and

a signal conditioner, mounted on the circuit board, for receiving the output signal and transmitting the output signal to a computer located on the vehicle.

11. The system as defined in claim 10, wherein the operational amplifier amplifies the output signal by a gain value.

12. The system as defined in claim 11, wherein the signal conditioner sets the gain value.

13. The system as defined in claim 10, wherein the strain indicator is selected from a group consisting of a S-shaped trace, a single flat grid, a flattened helix or wraparound grid, an equiangular rosette with adjacent elements and a rectangular rosette with layered elements.

14. The system as defined in claim 10, wherein the strain indicator is a non-linear metallic trace.

15. The system as defined in claim 10, further comprising a bridge network coupled to the strain indicator.

16. A method for monitoring the strain level of a circuit board located on a vehicle, comprising:

performing a vibration analysis on the circuit board to identify at least one position on the circuit board experiencing a relatively large amount of strain during operation of the vehicle;

positioning an apparatus on the circuit board at the at least one position identified by the vibration analysis;

monitoring changes in the resistance of the apparatus using an amplifier;

generating an output signal based on the changes in the resistance of the apparatus; and

transmitting the output signal to a computer on the vehicle.

17. The method as defined in claim 16, wherein the apparatus is a trace integrated with the circuit board.

18. The method as defined in claim 16, wherein the apparatus is selected from a group consisting of a S-shaped trace, a single flat grid, a flattened helix or wraparound grid, an equiangular rosette with adjacent elements and a rectangular rosette with layered elements.

19. The method as defined in claim 16, wherein the apparatus is a semiconductor chip capable of sensing strains imposed on the circuit board.

20. The method as defined in claim 16, further comprising amplifying the output signal.